"Dedicated to Public Service"

THE RADIATOR

Golden Empire Amateur Radio Society, Inc.

Chico

SPECIAL SERVICE CLUB

W6RHC
IRLP #8170

www.gearsw6rhc.org

P.O.Box 202 Chico, CA 95927

January 2024 Newsletter	GEARS Founded August 13, 1939

Happy New Year! This year GEARS will be celebrating our eighty-fifth year as a club. Amazing isn't is.

At the GEARS December meeting we elected new club officers for 2024. They are:

Jamie Johnston KN6PWW President
Larry Mitchell KF6NCX Vice President
Secretary Vacant
Jim Matthews K6EST Treasurer
Bennett Laskey K6CEL Board Member
Kevin Sterling K7KFS Board Member
Darrell Chestanult KN6QXL Board Member

We still need a secretary, if you'd like to serve please contact Jamie jamieckt2@comcast.net
Our board meetings are once a month, online by video conference. All members are welcome.

Of course our December meeting was also our Christmas Party. We shared some delicious food and enjoyed a gift exchange.

Michael Ellithorp KF6OBI and Michael Favor N6FAV are working on a solution to the inference issue on the GEARS West repeater. We will probably need to choose a different frequency pair. Due to the snow, this change probably won't be made until spring time. The GEARS East VHF repeater is functioning very well and will continue to be used for our weekly Tuesday night net. We are working on using the GEARS East UHF repeater to join the WIN System of connected repeaters. Hopefuly we can complete this within a few weeks. See https://www.winsystem.org/ for more information. Your dues and donations help keep our repeaters operating.

The new year will bring some great activities for our club. I'm looking forward to Field Day, Steak Bake, JOTA and other events. There will be our monthly meeting on the third Monday of each month. We will continue to meet at the Chico Public Library, 1108 Sherman Ave. 6 pm social hour, 7 pm meeting. At this meeting we will be discussing linked repeater systems such as WIN System and The C.A.R.L.A. System.

Our monthly breakfast will continue to meet on the second Saturday each month, 9am at Farmer's Skillet on Cohasset in Chico.

Jim Matthews K6EST

January 2024 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 7pm GARS Net 8pm ARES Net	2 7pm PARS Net 7:30pm GEARS Net	3	4 7:30pm Simplex Net	5	6
7 8pm OARS Net	8 7pm GARS Net 7pm GEARS Board Meeting 8pm ARES Net	9 7pm PARS Net 7:30pm GEARS Net	10	11 7:30pm Simplex Net	12 7pm OARS meeting 7pm GARS meeting	13 9am Chico Breakfast
14 8pm OARS Net	15 7pm GARS Net 8pm ARES Net 6pm GEARS Meeting	16 7pm PARS Net 7:30pm GEARS Net	17	18 7:30pm Simplex Net	19	20
21 8pm OARS Net	22 7pm GARS Net 8pm ARES Net	23 7pm PARS Net 7:30pm GEARS Net	24	25 7:30 Simplex Net	26	27 9am OARS Breakfast
28	29 7pm GARS Net 8pm ARES Net	30 7pm PARS Net 7:30pm GEARS Net	31			

VEC Testing, FCC License Exam available by appointment. For information or registration call Tom Rider, W6JS 530-514-9211
Chico Breakfast 2nd Saturday 9am Farmers Skillet Cohasset Rd, Chico
GEARS Board Meeting 1st Monday 7pm by Google video meetups.
PARS Meeting 2nd Thursday 6:30pm, doors open 6pm Old Magalia Community Resource Center
OARS Meeting Second Friday of the month, St. Pauls Episcopal Church Hall, Oroville.
GARS Meeting Second Friday of the month, Lutheran Church Hall, Artois.
GEARS Meeting, Doors open 6pm, meeting 7pm at Chico Public Library, 1108 Sherman Ave, Chico
OARS Breakfast 4th Saturday of the month, at Cornucopia of Oroville.

NETS:
OARS Club Net Sunday 8pm 146.655 Mhz - PL 136.5
GARS Club Net Monday,7:00 pm 147.105 MHz + PL 110.09, secondary: 146.850 MHz-PL 110.9
Yuba Sutter Club Net Monday 7pm 146.085 MHz + PL 127.3
GEARS Club Net Tuesdays 7:30 PM 146.850 MHz - PL 110.9
PARS Club Net Tuesday 7pm 145.290 - PL 110.9
Simplex Net Thursday 7:30 p.m. 146.52 no tone
Yuba Sutter ARES Net Thursdays 7pm 146.085 MHz + PL 127.3
Sacramento Valley Traffic Net Nightly 9:00 PM 146.850 MHz - PL 110.9

Ham Radio 101: Modes

By Mark Haverstock, K8MSH

What's a "mode"? The term really has two meanings in ham radio, and the definitions overlap somewhat. An operating mode is a description of what you are doing to send and receive signals. For example, the term phone refers to using your voice on the radio.

Modulation mode refers to the specific method by which information is sent over the air, such as SSB, FM, and AM.

An operating mode may be performed with one or more individual modulation modes. Here's a chart that shows some of the relationships:

Operating Mode	Modulation Mode
Phone	SSB, AM, FM, Digital Phone (D-STAR, DMR, System Fusion)
Digital	RTTY, PSK31, FT8, JT65, Packet (and many more)
CW	CW, Computer CW

If you look closely, you'll see some examples of the overlap. DMR is both a phone and digital modulation mode. Likewise, you can use a computer to send and decode CW digitally.

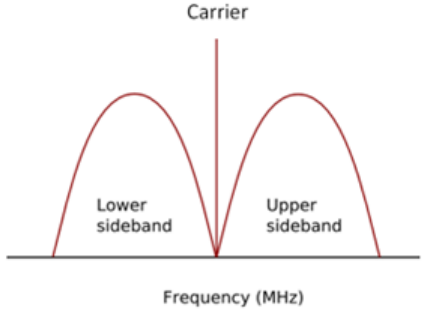
It's possible to use any modulation mode on any band or frequency. However, different modes work better on different bands. For example, FM takes up a significant amount of space in the radio spectrum. That's why it's located on 10 meters and above where there's lots of room.

But wait a minute—aren't there AM and FM frequency bands? Well, these are also generic names for the radio AM frequency band of 530-1700KHz and FM frequency band 88-108MHz. They're identified by the mode of broadcast signals transmitted there.

Riding the Wave

AM (Amplitude Modulation) is the oldest form of voice modulation. When you speak into the microphone of an AM transmitter, the microphone converts your voice into a varying voltage. Amplitude modulation adds this to the carrier, with three separate frequencies being transmitted: the original carrier frequency, a lower sideband (LSB) below the carrier frequency, and an upper sideband (USB) above the carrier frequency. It's still used by a small group of amateurs, but most ham voice activity on HF has moved to SSB.

SSB (Single Sideband) is a descendant of traditional AM. Compared to AM, SSB is a much more efficient mode since all of the transmitter's power goes into transmitting useful intelligence. In SSB transmitters, the carrier and one sideband are removed before the signal is amplified. This means an SSB signal only occupies about half the frequency space of a comparable AM signal, allowing more activity on the ham bands.



AM signal. For SSB, the carrier and one of the sidebands is removed.

There are two sidebands, USB (upper) and LSB (lower). On the HF bands above 9 MHz, the voice operation takes place using USB. Below 9

MHz, you find everyone on LSB, except on 60 meters. By putting all of the power into one sideband, the effect on the signal-to-noise ratio is a four-fold (or 6 dB) improvement.

FM (Frequency Modulation) is the mode of choice for local VHF/UHF operations, fixed or mobile, simplex or repeater based. The audio signal modulates the frequency of the transmitter over a small range. It offers good performance with simple equipment requirements. The big advantage of FM is its audio quality and immunity to noise, but it occupies more frequency space than AM or SSB.

CW (Continuous Wave) is the oldest mode of wireless transmission, the simplest, and one of the most efficient. It consists of just turning an unmodulated carrier on and off in a coded pattern that represents characters–the International Morse Code. Technically, it's a digital mode.

Radioteletype (RTTY) has been in use longer than any other digital mode except for Morse code. It involves shifting of the carrier between the mark and space to generate characters in the Baudot code, a more elaborate version of Morse code. At the receiver, the Baudot signals originally produced the decoded text on printers. Now radio displays or computer screens are used.

DATA (Digital Modulation) is becoming a popular mode among radio amateurs. The main methods used to modulate digital signals are amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK). Sounds really technical, but it still boils down to basic binary where each shift is a transition from 0 to 1 and 1 to 0–or on/off.

New Frontiers

Transceivers will continue to feature more options as technology continues to improve. If you have an older transceiver, you can operate digital modes by adding sound card interfaces like the Tigertronics SignaLink USB Interface Unit or the RigExpert TI-3000 Digital Mode and Radio Control Interface. Many current transceivers are capable of using both computer control and dedicated data modes. Transceivers with built-in sound cards eliminate the need for an external interface. Either way, you can take advantage of current and new digital modes.

RTTY is a good example of a mode now incorporated into current transceivers. Modern radios like the Icom IC-7300, Yaesu FTDX10, or Kenwood TS-890S can decode through the receiver and send using message memory or a computer. The TS-890S provides the additional option of typing on the fly with a USB keyboard–no computer needed.

Modern digital modes such as FT8 have gained worldwide popularity and account for a large portion of all ham radio activity on the HF bands. It's a frequency shift keying, digital weak-signal mode used mostly on the HF bands. Using advanced signal processing technology, FT8 can decode signals with a low signal-to-noise ratio much better than CW or SSB. FT4, a variant of FT8, is also gaining a large following and is designed specifically for radio contesting.

What's Next?

It appears the future of amateur radio modes will continue to be built on software and supported by computers, as well as new generations of full-featured transceivers. These combinations continue to fundamentally change many of the modes we'll use to make radio contacts. Hardware retrofits and specialized interfaces are becoming a thing of the past.

.-- -…. .-. …. -.-. .-- -…. .-. …. -.-. .-- -…. .-. …. -.-. .-- -…. .-. …. -.-. .-- -…. .-. …. -.-. .-- -…. .-. …. -.-.

“Hoola Loop” Antenna a Big Success!

By Steve VanSickle, WB2HPR

Using my knowledge and experience gained from constructing several prototypes, a 40 meter (7 mHz) version was built first. The initial designs were hastily constructed in order to test theory and to resolve an on-going RFI (interference) problem at the WB2HPR QTH. These experimental designs worked beyond expectations, thus encouraging the design of the first “Hoola Loop” -- the 40 meter version. It is so-named because it employs actual hoola hoops as a part of the mechanical structure.

The 40 meter Hoola Loop was built to answer the need for an indoor installation in the HOA restricted property of the WB2DGE QTH. Initial tests were successful and the antenna has been in service now for 5 years. An indoor antenna allows those with similar limitations to get on the HF bands. The Hoola Loop is but one answer to solving this dilemma. Building on the success of the 40 meter Hoola Loop, the 75 meter (4 mHz) version was developed, utilizing many of the construction techniques used to build the 40 meter loop. The purpose of building the 75 meter loop was to employ its inherent directivity to boost desirable signals and null out interference.

During my initial tests, contact were made with WA2WAP, WQ2A, and N2CJF using this setup. Transmitting a 25 watt PEP Lower Sideband signal, the two-way transmissions ranged from eight miles to WA2WAP, 60 miles to WQ2A, and 153 miles to N2CJF. Also, the WB2HPR/2 signals were received by an SDR, NA5B, located in Springfield, Virginia – a distance of 331 miles!

When the Hoola Loop antennas were designed and built, the objective was to answer a need for an indoor antenna for the HF spectrum, using readily available parts, based on established theory, with basic hand tools and no exotic skill sets. All of these objectives were met.

The cost of materials was approximately $75, and the time for the actual build was two days. The cost was for newly purchased materials, but could be reduced by using other construction techniques. Most of the materials were off-the-shelf items from Home Depot and Walmart.

It’s hoped that this successful demonstration encourages others to experiment with antennas of all sorts as an answer to their particular needs or satisfy their curiosity. Despite their inherently poor efficiency, indoor loop antennas, in general, will make HF communication possible in HOA or other environments.

If you’d like to build your own Hoola Loop antenna, contact WB2HPR by email: stevewb2hpr@gmail.com.

The Radio Amateur's Code

By the ARRL

The Radio Amateur is:

CONSIDERATE...He/[She] never knowingly operates in such a way as to lessen the pleasure of others.

LOYAL...He/[She] offers loyalty, encouragement and support to other amateurs, local clubs, the IARU Radio Society in his/[her] country, through which Amateur Radio in his/[her] country is represented nationally and internationally.

PROGRESSIVE...He/[She] keeps his/[her] station up to date. It is well-built and efficient. His/[Her] operating practice is above reproach.

FRIENDLY...He/[She] operates slowly and patiently when requested; offers friendly advice and counsel to beginners; kind assistance, cooperation and consideration for the interests of others. These are the marks of the amateur spirit.

BALANCED...Radio is a hobby, never interfering with duties owed to family, job, school or community.

PATRIOTIC...His/[Her] station and skills are always ready for service to country and community.

- adapted from the original Amateur's Code, written by Paul M. Segal, W9EEA, in 1928

GEARS Officers:

President.....Jamie Johnson KN6PWW
Vice-President.....Larry Mitchell KF6NCX
Treasurer.....Jim Matthews K6EST
Secretary.....Vacant
Director.....Bennett Laskey K6CEL
Director.....Darrell Chestanult KN6QXL
Director.....Kevin Sterling K7KFS
Past President.....Paul Stewart N6PAS
VEC Chairman.....Tom Rider W6JS

GEARS Newsletter archive is here:
https://drive.google.com/GEARS
Follow GEARS on Facebook www.facebook.com

GEARS Newsletter edited by Jim Matthews K6EST

JiminChico@yahoo.com

Your dues and contributions support our local repeaters, ARES, Field Day and outreach events to keep amateur radio alive in our area. GEARS also makes donations to support other local repeaters and clubs.

GEARS Dues and Donations can be made online at
paypal.me/w6rhc
Or by mail to:
GEARS
PO Box 202
Chico, CA 95927